

APRIL/MAY 2025

23USBC33 — TISSUE CULTURE (SEC IV)

19. Analyze the techniques, precautions, and influencing factors involved in explant inoculation onto culture media.
20. Examine the process of molecular farming using transgenic plants and explore its key applications.

Time : Three hours

Maximum : 75 marks



SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

List the advantages of callus culture.

2. Define organ culture and its significance.
3. Identify essential micronutrients required for microbial growth.
4. Explain the role of solidifying agents in culture media.
5. Define gene transfer and its importance.
6. State the primary purpose of gene transfer in animals.
7. Describe an explant in cell culture.
8. Highlight the main goal of sterilization in cell culture.

9. Outline key applications of animal cell culture.
10. Define "bioreactor" in the context of molecular farming.

SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Describe the process of seed culture.

Or

- (b) Explain the importance of protoplast culture in plant biotechnology.

12. (a) Discuss the significance of pH control in microbial culture incubation.

Or

- (b) Explain the role of macro nutrients in microbial growth and provide examples of key macro nutrients.

13. (a) Outline the steps involved in microinjection as a gene transfer method in animals.

Or

- (b) Discuss the role of *Agrobacterium tumefaciens* in indirect gene transfer in plants.

14. (a) Explain the steps involved in sterilizing explants for tissue culture.

Or

- (b) Describe the process of selecting explants for cell culture.

- (a) Describe the process of creating transgenic plants for herbicide resistance.

Or

- (b) Outline the steps involved in animal cloning using somatic cell nuclear transfer (SCNT).

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Describe the tools and techniques essential for tissue culture, emphasizing the role of culture media, growth regulators, and aseptic conditions.
17. Discuss the preparation and sterilization methods for liquid, solid, and semi-solid culture media.
18. Provide an in-depth explanation of direct gene transfer techniques in plants, including electroporation, biolistics and microinjection.

